Winter 2025

THE NEBRASKA Surveyor

PROFESSIONAL SURVEYORS ASSOCIATION OF NEBRASKA — FOUNDED 1964 ®

In this Issue

2025 PSAN Officers

Chad Marsh, President (2024-2025)

Brian Foral, President-elect (2025)

Jeremy Feusner, Secretary (2024-2025)

Josh Borchers, Treasurer (2025-2026)

Board Members

Jai Andrist (2024-2025)

Dylan Campbell (2025-2026)

John Howell (2025-2026)

Mike McNaney (2025-2026)

Chris Schulte (2024-2025)

Casey Sherlock - State Surveyor

2025 Advertising Rates

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Full Page	$100	$150
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$25/4 Issues - members only.

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- Payment must accompany the advertisement request.
- All ads must be professional in nature.
- PSAN reserves the right to reject any advertisement of whatever nature, without cause.
- Published quarterly - Winter, Spring, Summer, Fall.

Editor: Gwen Bowers at 402-432-3444
or email: PSAN@nebraskasurveyor.com

THE NEBRASKA Surveyor

Winter 2025

Contents

Professional Surveyors Association of Nebraska

The Nebraska Surveyor is the official publication of the Professional Surveyors Association of Nebraska (PSAN). It is published quarterly: Winter, Spring, Summer, and Fall. All issues are published on the PSAN website. Material published is not copyrighted and may be reprinted without written permission as long as credit is given.

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The Nebraska Surveyor deadlines to submit content for publication:

Winter: February 15
Spring: May 15
Summer: August 15
Fall: November 15

President's Letter

March 10, 2025

Thank you to all who attended our Winter Conference last month. It was great to see everyone and catch up with old friends. Hopefully, you all learned a little something from our great lineup of speakers. It was a great turnout considering the weather that set in on the travel day.

I would like to thank everyone for their generosity at the auction this year. I would like to recognize Seiler Instruments, Transit Works, Boni Edwards, LaVerne Schroeder and everyone else who donated items to the auction and raffle. Special thanks to Dan and Erica Martinez for setting up the auction and raffle, your efforts are greatly appreciated.

I look forward to seeing you at the Summer Seminar in July. Have a safe spring!

Sincerely,

Chad W. Marsh

Chad Marsh
PSAN President

2025 National Surveyors Week March 16-22

Global Surveyors' Day March 21

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3) Conduct a Boy Scouts Merit Badge event

4) Obtain a proclamation from your state or local government

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6) Try Surveying Mark Recon: https://oceanservice.noaa.gov/education/dyw-survey-hurting.html

7) Plan GPS Benchmarks: https://geodesy.noaa.gov/GPSonBM/

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- Local civic clubs (American Legion, Elks, Grange, Kiwanis, Lions, Rotary, Ruritan, VFW, etc.)
- Professional organizations (realtors, attorneys, bankers, title agents, etc.)
- Teachers and School Counselors

NSPS

Summary of February 13, 2025 PSAN General Assembly Annual Meeting

Subject to approval by the General Assembly

The PSAN General Assembly Annual Meeting on February 13, 2025, was held at the Holiday Inn & Convention Center in Kearney, Nebraska and began at 8:15AM CT.

The roll call was as follows:

President, Chad Marsh — Present
Vice President, Todd Whitfield — Present
Treasurer, Josh Borchers — Present
Secretary, Jeremy Feusner — Present
Administrative Secretary, Gwen Bowers — Present
Directors
Jay Dubs, Chairman — Absent
Jai Andrist—Absent
Brian Foral — Present
Carl Gilbert — Present
Jerry Penry — Present
Chris Schulte—Present
Casey Sherlock, State Surveyor — Present
Jon Carrell, SENLSA Affiliate — Absent

Minutes from the February 8, 2024 PSAN Annual Meeting were read and approved.

Officer Reports

Treasurer, Josh Borchers: The Treasurer's Report dated February 6, 2025 was approved.

Administrative Secretary, Gwen Bowers: Written report submitted.

Director Reports

Chris Schulte: As a new member of the Board, described the importance of being involved and the need for volunteers for PSAN Officers, Board Members, and Committee Members. This organization is important to the profession, but "we" need to be engaged and active.

Casey Sherlock: Shared statistics on new licenses, SITs issued and recognized those who were present. Gave a short update regarding complaints. Talked about renewals and new stamps and digital seals. Briefly spoke about a legislative bill that may affect the Board of Education Lands and Funds.

Standing Committees

Conference: Written report was submitted. J. Feusner talked about the reasons for the increase in registration fees for the 2025 PSAN Winter Conference. Still looking working on a date and location for the 2025 Summer Seminar.

Education: D. Campbell spoke to getting involved in the community and recruitment. The committee put on an aerial course that was very well received and they were asked to present a second time. Asked the general assembly for assistance locating free venues to host FS Prep classes; would like to have two per year, once on the east side of the state and once on the west side for the state.

Historical: J. Penry is planning a work day at the Cast Iron Monument in April with KSLS, 10/11 News has requested to be part of this event.

Legislative: Written report submitted. T. Whitfield noted that he will reach out to our lobbyist regarding LB652 and will share information with PSAN membership.

GIS: Written report submitted. J. Sather shared the upcoming GIS/LIS Symposium is scheduled for April 22-23 at the Lincoln Marriott Cornhusker. Also briefly communicated the 2025 committee plans.

Publications: Written report submitted.

Nominations & Membership: W. Headlee echoed C. Schulte's report on the importance of the PSAN organization and asked that members reach out to him if interested in serving in the organization in any capacity.

NSPS: Written report submitted.

Election Results & Installation of New Officers

President-elect: Brian Foral
Treasurer: Josh Borchers
Director: Dylan Campbell
Director: John Howell
Director: Steve "Mike" McNaney

Applications for Membership

Three applications for Active Membership were submitted and approved.

The meeting was adjourned at 9:33AM CT.

After the complete 2025 General Assembly Minutes are approved by the General Assembly, they will be published to the PSAN website.
https://nebraskasurveyor.com/meeting-minutes/

Congratulations to the newly elected PSAN Officers and Board of Directors!

2025 President-elect

Brian Foral, LS 588

2025-2026 Treasurer

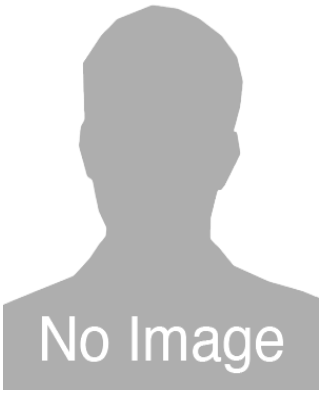
Josh Borchers, LS 766

2025-2026 Board Members

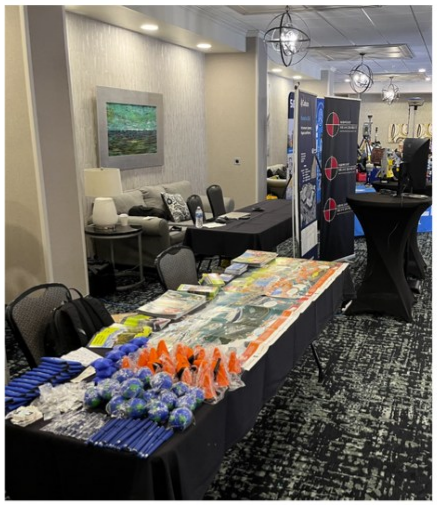
Dylan Campbell, LS 818

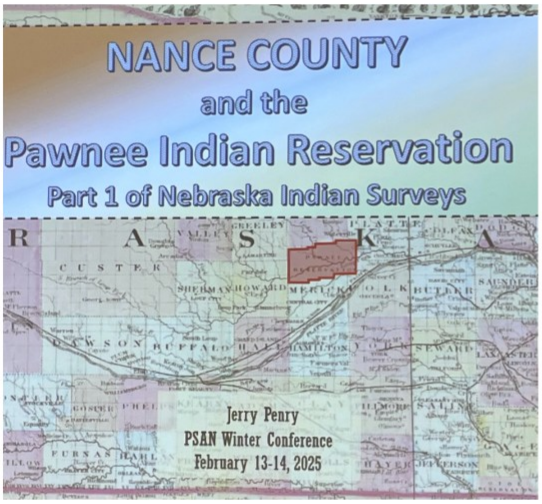
John Howell, LS 857

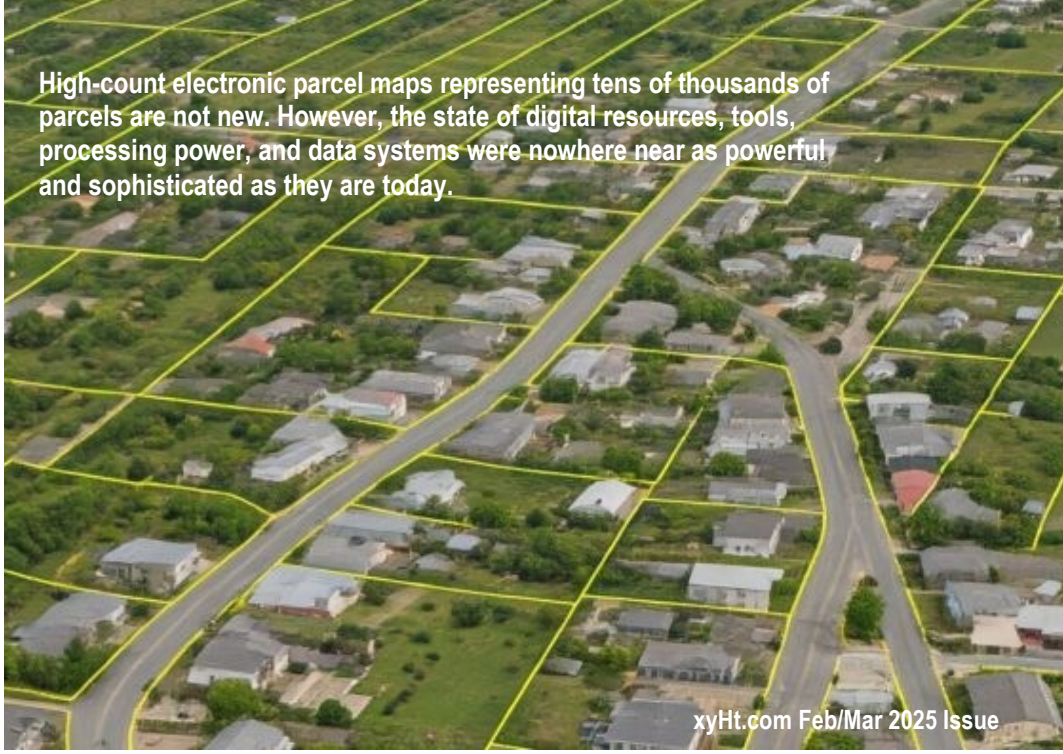
Mike McNaney, LS 605



2025 PSAN Winter Conference







High-count electronic parcel maps representing tens of thousands of parcels are not new. However, the state of digital resources, tools, processing power, and data systems were nowhere near as powerful and sophisticated as they are today.

xyHt.com Feb/Mar 2025 Issue

Advancements

in Parcel Mapping Tools

Part 1

Whether a parcel map is created for an engineering project, land development, valuation, tax assessment, land administration and management, for a subdivision, city, county, or whole country, the tools to create and manage them have dramatically improved.

BY GAVIN SCHROCK

Surveyors are keenly aware of how much sweat (and tears) can go into the surveying of an individual parcel and for finding, collecting, and evaluating the evidence and records to determine the boundary. Now imagine doing this on a grand scale: for a development, city, county, or even an entire country.

PARCEL MAPS

Parcel maps, from a few parcels to hundreds, thousands, or even millions, are subject to the same fundamentals as for an individual parcel: fidelity to the physical evidence on the ground, to the records, to case law, and relationship to adjoining parcels. It's not just about creating geometry. The key is how well geometry represents the evidence and records.

Recreating that geometry with ink and paper, the standard until the 1980s, required the addition of text and notes to provide the link between evidence and records. But you are working within the bounds of a physical medium. In the electronic age these texts and notes are stored as attributes in a database and tied to original source documents. With such geometry and attributes, digital maps and scale maps can be created for publication if required.

THE FUNDAMENTALS

Parcel maps can serve a wide spectrum of uses. It might be for tax assessment, where the precision and accuracy may not need to be as stringent as a recorded survey. A parcel map created for inclusion in a set of engineering plans would need to be survey quality, for example, to ensure that constructed elements fall within the subject parcels, easements, and rights-of-way.

A certain class of parcel map, known as a cadastre (or cadaster) may serve as the legal instrument of tenure, title, and/or ownership. There are entire countries where a national cadastre is the official registry of titles. In such cases, Cadastre's will be held to the same stringent expectations, and workflows as for mapped boundary surveys—plus a few more:

- Physical evidence in the field, where each may apply in the hierarchy of evidence. While this can vary from state or country, such hierarchies can include natural and human-made monuments, evidence of occupation, calls to natural features, etc.
- System of Record. Those officially recorded chains of title, deeds, other records of tenure, and other instruments of conveyance supporting parcel lineage.
- The use of coordinate geometry input tools (COGO) to faithfully "embed" the defining geometry in the electronic medium and tools employed. In addition, there is a need to be able to

Linda M. Foster, PLS, GISP, MGIS Director, Land Records/Cadastre Solutions, Esri.

perform statistical analyses and adjustments (where appropriate) on these geometries.

- Database archiving. While not always required, the ability to access and view a snapshot in time of stored parcel information is becoming increasingly important. This is especially true for cadastres.
- Multi-purpose cadastre. For example, for the parcel map to accommodate other uses, like assessment, public safety, land administration, and management.

COGO tools in CAD, civil, and surveying software, due to the inherent data structure for linework elements and adjustment tools, have always been up to the task of parcel creation—but not necessarily at scale, and often with limited capabilities for incorporating records and databases.

While GIS is more data-centric than the precise geometry of CAD, it is far better suited for creating and managing maps with many parcels. Cadastres, especially at a national level, are almost without exception created and managed in GIS. Legacy GIS did not have more than rudimentary COGO tools and presented low-fidelity geometry (i.e., segmented curves) primarily for display purposes. High-fidelity geometries were often created in CAD and imported into GIS. That is still an option, but now this is only one of many options.

GIS parcel maps covering large areas have been around for decades. However, early adopters often needed to do a lot of customization within the base GIS environment. In a way, these pioneers may have become hobbled by their own forward-thinking. Because of such deep-rooted customization, many legacy parcel theme managers felt that migration to new and improved environments was sometimes viewed as too costly and time-consuming. This has changed with advanced out-of-the box functionality.

The tools to create and manage a high-fidelity, precise, and data/record-rich parcel map or cadastre have improved by orders of magnitude. I was among those whose experiences dealing with the sometimes cumbersome, dual-environment reality of legacy parcel mapping have left some scars.

But this has all changed. If today's tools existed back in the day, there would be many more, high-fidelity parcel maps out there, powering effective management and decision-making, saving time, effort, money, and a lot of frayed nerves.

A FABRIC

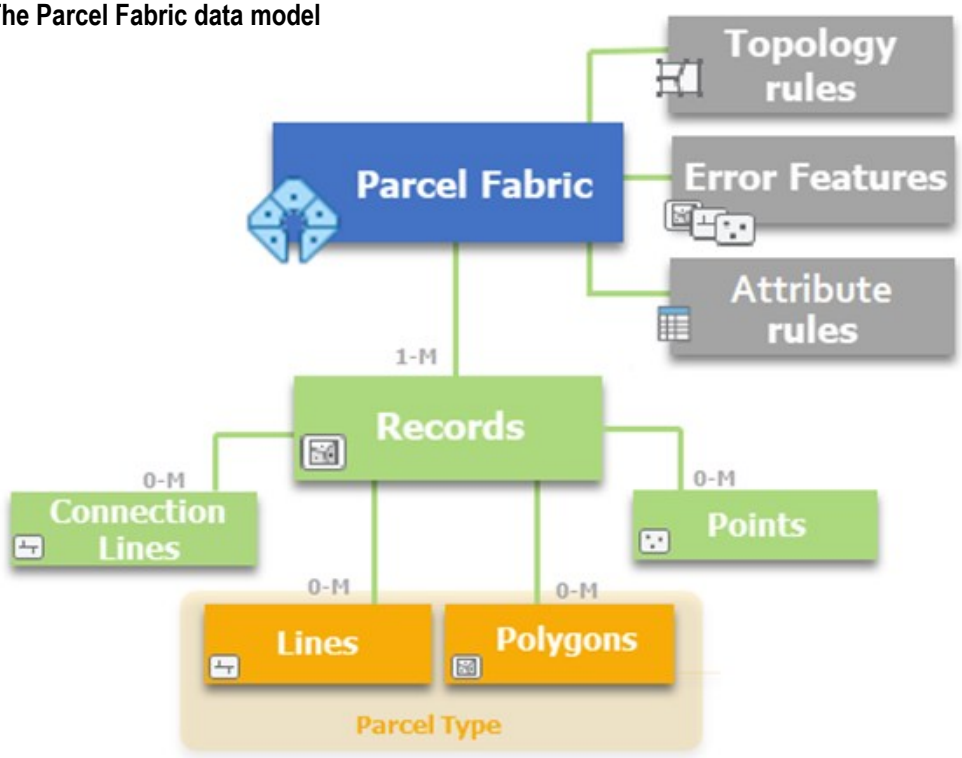
The example that most comes to mind is Esri's Parcel Fabric, available in ArcGIS Pro. Fabric is a good term for parcel maps and cadastres as metaphor for the interwoven structure (and data) of land parcels. Not an endorsement, but this is among the top solutions I have found yet to undertake such mapping.

An excellent paper on advances in parcel mapping is "Maintaining Cadastral Measurement Data in the Parcel Fabric" (found on www.fig.net). The paper was authored by Tim Hodson, principal product engineer at Esri and presented at the FIG (International Federation of Surveying) Working Week in 2020 in Amsterdam Netherlands. From the paper summary:

Tim Hodson, Principal Product Engineer at Esri.

"The next generation parcel fabric technology allows cadastral organizations to store parcel-based measurement

The Parcel Fabric data model



information as well as its metadata. Organizations that serve as the authoritative source for multi-purpose land parcel information systems require specific metrics on the captured data."

Such a fabric is not just geometry, but also database driven, and has been a long-desired meld of environments. This not only solves legacy workflow issues but makes the end products, such as web maps, apps, and web services, much more useful.

Cadastral, parcel, and boundary geometries hold much more value if the relationship to the defining records is preserved.

"The data model for the Parcel Fabric starts with the database table we call the "records feature class" said Hodson. "It is basically a table that represents each individual land record. For example, if you have a new subdivision, you create a record in the records feature class. It represents that recorded plat or subdivision document as a single feature. But then, there is a one-to-many relationship from that record to every parcel in the plat that is created via COGO, etc."

A parcel can have multiple associated record documents. Say that in Hodson's example, several of the plat parcels are subject to rights-of-way or easements, initially or later; those record documents can be represented and attached to the parcel. The list of scenarios can go on and on. "We are basically managing the parcel fabric as a system of records," said Hodson.

A key feature of Parcel Fabric is its ability to track historical parcel lineage using link charts. These show a flowchart of the changes between parent and child parcels, that are tracked through edit workflows like a parcel split or a merge of parcels.

"The records are a driver in many ways," said Linda M. Foster, PLS, GISP, MGIS director, land records/cadastre solutions at Esri. "Using records, we can also define parcel lineage. That could be chain-of-title in a cadastre. We can model what's happening over time in our land records or our land system." Foster also mused about how great it would have been to have such capabilities back when the original Public Lands Survey System (PLSS) of the U.S. was created.

You can add multiple parcel types, defined for your needs.

"Let's say you have a PLSS section quarter section you've resolved," said Hodson. "You can create separate parcel types for those, for easements, right-of-way, tax parcels, and lots. You can define these when you are setting up your model and add them as needed."

While in the U.S. there may never be a national or state-level cadastre as the instrument of title registration and ownership, there are maps for tax assessment in nearly every county, city, or state (depending on respective property taxation scenarios). These might range from analog to digital, in CAD or GIS.

"Sometimes they'd take a blueline map, hang it up, take a photo or scan it, and build a tax parcel theme from it," said Foster. "Now, in addition to those options, you can create the parcels with COGO to get it as precise as you need."

Expedience and immediate needs drove the creation of many legacy parcel maps (e.g., 9-1-1 modernization in the early 2000s), and often that required compromise. However, even if a low-precision map can serve a great many valid needs, plus or minus one meter, for example, can result in no small amount of consternation for landowners, not to mention heart palpitations in surveyors.

New tools certainly modernize parcel mapping, but also high-resolution aerial (and drone) images, and more highly productive field surveying tools (in the right hands), add to a mix that results in (or, at a minimum, demands) better parcel bases.

In Part 2 will explore how the tools have been made surveyor-friendly, and who's implementing ambitious parcel mapping programs.

Gavin Schrock is a professional land surveyor who writes on surveying, mapping, GIS, data management, reality capture, satellite navigation, and emerging technologies.

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2025 Projects

Project Name: Inkhosiyaphendvula
Status: To be completed in 2025
Beneficiaries: 1800
Bridge Span: 84m
Bridge Type: Suspension
Location: Eswatini

Project Name: Chunchuli Alto
Status: To be completed n 2025
Beneficiaries: 1190
Bridge Span: 36m
Bridge Type: Suspended
Location: Bolivia

Project Name: Papa Chacra
Status: To be completed in 2025
Beneficiaries: 330
Bridge Span: 38m
Bridge Type: Suspended
Location: Bolivia

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THANK YOU!

To David and the Transit Works team -
We, the Engineers in Action team, along with the thousands of community members who will benefit from this initiative, express our sincere thanks to you for your generous donation of new total stations, data collectors, and laser levels. We are grateful to have you as part of our EIA family. In 2025, we look forward to witnessing the tangible impact of this equipment for our staff, our students, and most importantly, our partner communities who will utilize this infrastructure for generations to come.

A Sneak Peek at Anticipated **2025** Technology Advancements and Innovations

Dr. Stuart Riley // 12.31.2024
amerisurv.com

The steady progression of technological advancements, and more importantly, the way the surveying community puts these tools to work, continues to reshape the way tasks are performed and projects delivered.

The standardization of UAVs in surveyor toolboxes, a growing reliance on ground-based robots for gathering as-built data and even the ability to capture high quality reality with a smartphone are just a few progressive steps from this past year. These adaptations are essential to the maturity of means and methods if we as an industry are to meet growing demand.

Recent studies[1] show that the growth in the surveying and mapping services market is driven by several factors, including rapid urbanization, the expansion of infrastructure projects, and the increased adoption of advanced technologies. From precise land surveys to progress mapping on a job site, the use of technologies such as UAVs, LiDAR, and advanced GIS systems are all key pieces of the evolving capabilities, according to the report, helping ensure compliance, drive productivity and accuracy, deliver more sustainable results and improve safety.

Looking ahead to 2025, artificial intelligence (AI), far-reaching drone capabilities, reality capture and GNSS advances top our list of exciting things to come.

[1] researchandmarkets.com/reports/5141104/surveying-and-mapping-services-global

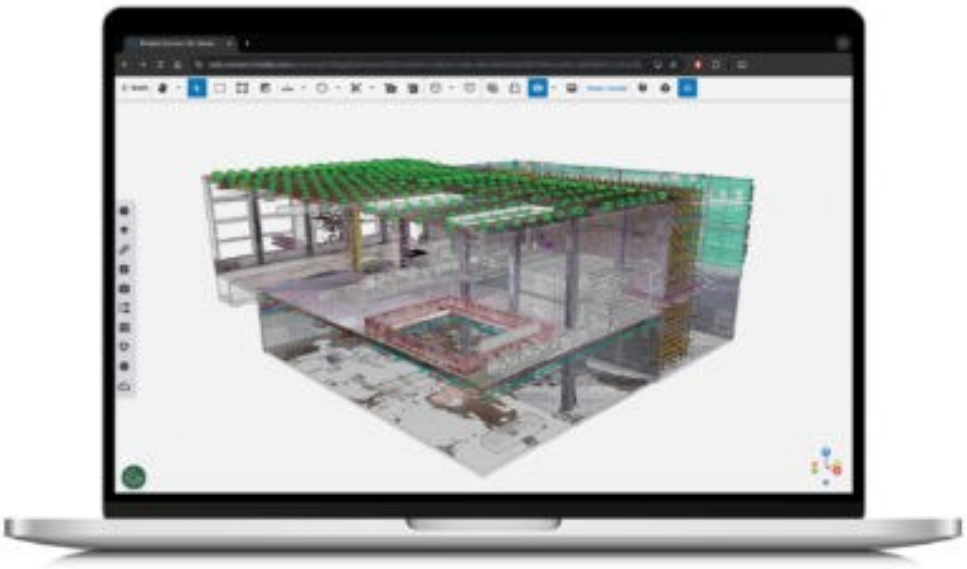
A PRECISE POINT IN TIME

Surprising to some will be the continued evolution of GNSS, a technology that is already deeply embedded in most survey workflows. These advances allow industry professionals to better gather precise points in deep urban canyons, survey closer to buildings, and push under a more dense canopy without needing to swap between using a GNSS rover or a total station.

In the coming year, we'll see steady, incremental improvements to core GNSS components, as well as inertial measurement unit (IMU) technology, which will improve receiver positioning accuracy and better handle signal disruptions, whether from solar activity, jamming, spoofing or multipath. These adaptations will have a tangible impact on the surveyors' ability to operate effectively in challenging environments where GNSS signals may be degraded or obstructed.

Tomorrow's solutions will be better equipped to obtain and maintain precision position and heading in a range of solutions for a wide variety of applications and in ever more complex conditions.

These capabilities will become more essential as we move through the peak of Solar Cycle 25 in the coming year. As documented in the August issue[2], the impact of solar storms in the coming year could be significant. The solar storm this past May was the largest in over 20 years, and it directly affected GNSS signals in North America.



The Trimble Reality Capture platform service enables more effective collaboration and the secure sharing of massive reality capture datasets captured with 3D laser scanning, mobile mapping and UAV systems.

To a degree, modern receivers are equipped to handle these events through multi-frequency capabilities. A receiver that can use two or more independent satellite systems (e.g., GPS, GLONASS, Galileo, BeiDou) reduces the chance of errors from solar disturbances. On that note, the coming year could also see the emergence of commercial GNSS constellations. While these new systems may not be fully operational in 2025, the impact of those constellations in the industry will further drive advances across the board.

Then there's the advancement of firmware purpose-built to counteract the effects of Solar Cycle 25. Solutions such as Trimble® IonoGuard™ are designed to mitigate ionospheric disruptions in positioning and navigation by minimizing performance impacts caused by scintillation or signal noise. It can optimize GNSS measurement processes, while also improving the signal tracking of disrupted GNSS signals. It's been tested in some of the most challenging atmospheric conditions.

Along similar lines, the coming year will also see continued advancement in GNSS correction services.

THE REALITY OF REAL-TIME DATA

The increasing availability of real-time

[2] amerisurv.com/2024/08/24/the-sun-is-heating-up-but-stay-cool/

The integration of Trimble CenterPoint RTX in the Trimble APX RTX direct georeferencing portfolio for UAV mapping delivers high accuracy, greater efficiency and ease of use.

correction services via satellite or IP/cellular sources has already made a marked difference in the surveying community, enabling centimeter position accuracy even in inaccessible regions that have no existing CORS.

These solutions leverage absolute positioning techniques to model and correct GNSS error sources. For instance, solutions such as Trimble CenterPoint® RTX have a horizontal root mean square error (RMS) accuracy of less than 2 cm and vertical RMS accuracy of less than 5 cm. Expect to see continued upgrades to these solutions that ensure the integrity of GNSS signals.

Already, GNSS processing engines such as Trimble ProPoint®, incorporate advanced GNSS signal processing to support RTK positioning, even in harsh tracking environments where unobstructed signals from at least four satellites are not possible.

To achieve even greater accuracy for UAV and land vehicle-based LiDAR mapping, Trimble's Applanix POSPac post-processing software pulls the RTX corrections in and combines them with GNSS observables and inertial data using Applanix IN-Fusion+ technology. This process results in a highly accurate and robust solution for creating 3D point clouds.

HIGH FLYING OPPORTUNITIES

Drones equipped with LiDAR and other sensors are expected to continue their upward trajectory, with greater emphasis on smaller, lighter, large area, higher performing solutions. UAV workflows can be tedious and time-consuming requiring a detailed plan, the setup of base stations, the download/upload/post-processing of data, datum adjustments, etc.

This past year, DroneDeploy integrated the Trimble Applanix post-processed RTX PPK solution directly into its cloud-based mapping solution. This configuration allows users to upload their drone imagery into the DroneDeploy cloud, push a button, and receive a high accuracy map product georeferenced in a consistent datum.

It's these types of advancements that will drive the advantages of drone-based surveying to new levels. Expect to see much greater progress in this type of aerial surveying in 2025.

Emerging software licensing methods will also continue to evolve. The industry will begin to move away from post-processing through a desktop

application with desktop licensing to real-time subscriptions directly within the hardware. For instance, as part of the new Trimble APX RTX product for georeferencing LiDAR and camera data collected on UAVs, Trimble recently introduced the CenterPoint RTX Complete subscription, which includes both the real-time CenterPoint RTX subscription and post-processing in POSPac UAV, eliminating the need for a separate POSPac UAV license, fee, or internet connection.

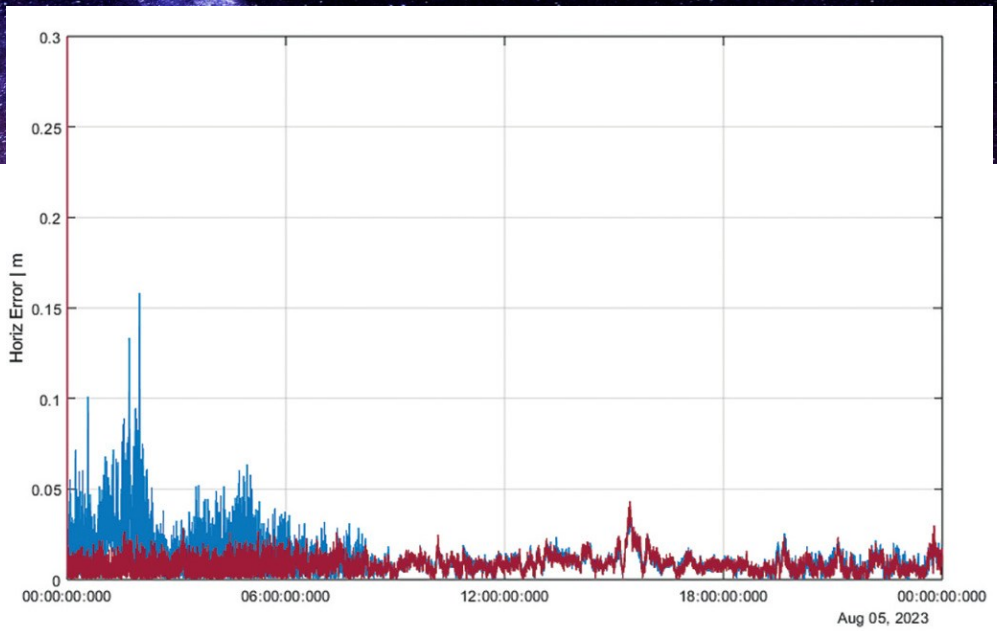
THE AI ADVANTAGE

In a recent Trimble survey, 59% of respondents said AI and machine learning (AI/ML) will be one of the industry's hottest topics in 2025.

That high expectation likely doesn't surprise anyone, as this technology has the potential to drive productivity by better using data and delivering real-time insights. We saw a number of features and functionalities emerge this past year focused on better using AI.

For instance, Trimble Business Center uses an AI algorithm to generate pavement condition reports from mobile mapping data, conduct quick stockpile volume calculations using drone data, and train datasets for tailored AI-optimized results. These kinds of AI capabilities will be foundational to future solutions.

Embedded AI algorithms will also extend the value of emerging augmented reality (AR) and reality capture tools and techniques.



Trimble's IonoGuard technology aims to mitigate ionospheric disruptions in positioning and navigation by minimizing performance impacts caused by scintillation or signal noise. This graph shows the extent to which IonoGuard was able to improve positional accuracy at a site in Sweden. The red line represents horizontal position error with IonoGuard enabled; the blue line represents IonoGuard disabled.

Reality capture technology such as laser scanning will continue to expand in the coming year, largely due to emerging services that effectively democratize data. Recent advancements enable faster and easier collaboration, and the secure sharing of massive reality capture datasets captured with 3D laser scanning, mobile mapping, and UAVs. These datasets are foundational to the emergence of interactive digital twins.

AN INTEROPERABLE TECH STACK

In the Trimble survey mentioned above, 59% of respondents said technology integration will be one of the main themes of 2025. Rightfully so. Studies[3] over the years have found that more than 95% of data gathered during engineering and construction of a project goes unused due to disconnected teams across project phases.

That stat points to one of the biggest challenges in today's ever evolving digital ecosystem: interoperability, or the ability to access, exchange, integrate and use data from multiple solutions.

While contractors are continuing to rapidly adopt new technology, the solutions they choose often don't speak to one another. That's begun to change with the adoption of more connected data environments and open API standards, which allow data from multiple systems to be visible and

[3] fmicorp.com/uploads/media/FMI_BigDataReport.pdf

actionable in one place. Even office-to-field solutions are better able to combine data from multiple sensors (survey data, drone data, scanning data), and streamline processing, storage, sharing, and analysis to reduce costs and enhance reliability.

These data-centric advancements will make it increasingly easier to exchange data automatically between systems, in the office and in the field, enabling teams to spend less time bringing data together and more time resolving problems.

Trimble and other construction technology vendors have made many advancements in this area due to the value it provides for today's contractors. More seamless data accessibility can be seen in solutions such as Trimble Access v2024.10 field software. The introduction of total station data output over Bluetooth and GNSS National Marine Electronics Association (NMEA) support over Bluetooth for Android devices broadens the scope of connectivity, ensuring seamless data transfer from Trimble Access to a range of third-party devices, such as ground penetrating radar. This year, Trimble included KML (formerly known as Keyhole Markup Language) support and Bentley LandXML export compatibility to further drive a more integrated workflow. Continued advances like these are essential in 2025.

Technology is certainly integral to the construction space, from planning through estimating, project management, and handover. Today's analytic tools provide data access in formats specific to the needs of all end users—from comprehensive reports and simple data comparisons, to visualized graphics and dashboards. In the coming year, we're going to see a greater emphasis on not just capturing more and better data at the source but aggregating that data from multiple sources and then converting it into actionable intelligence—all with immediacy at or near real-time and with minimal manual effort.

Dr. Stuart Riley is the Vice President, Technology—GNSS at Trimble.

Everything is Somewhere Podcast

From the rope stretchers of ancient Egypt to ubiquitous satellite precision, geospatial technology has ever been the bedrock of the constructed world and of civilization itself. Your host, land surveyor and infrastructure writer Angus Stocking, engages in regular conversation with today's location experts to determine exactly where, in space and time, we find ourselves today. Location, location, location; it's not just real estate, it's everything and, Everything is Somewhere.

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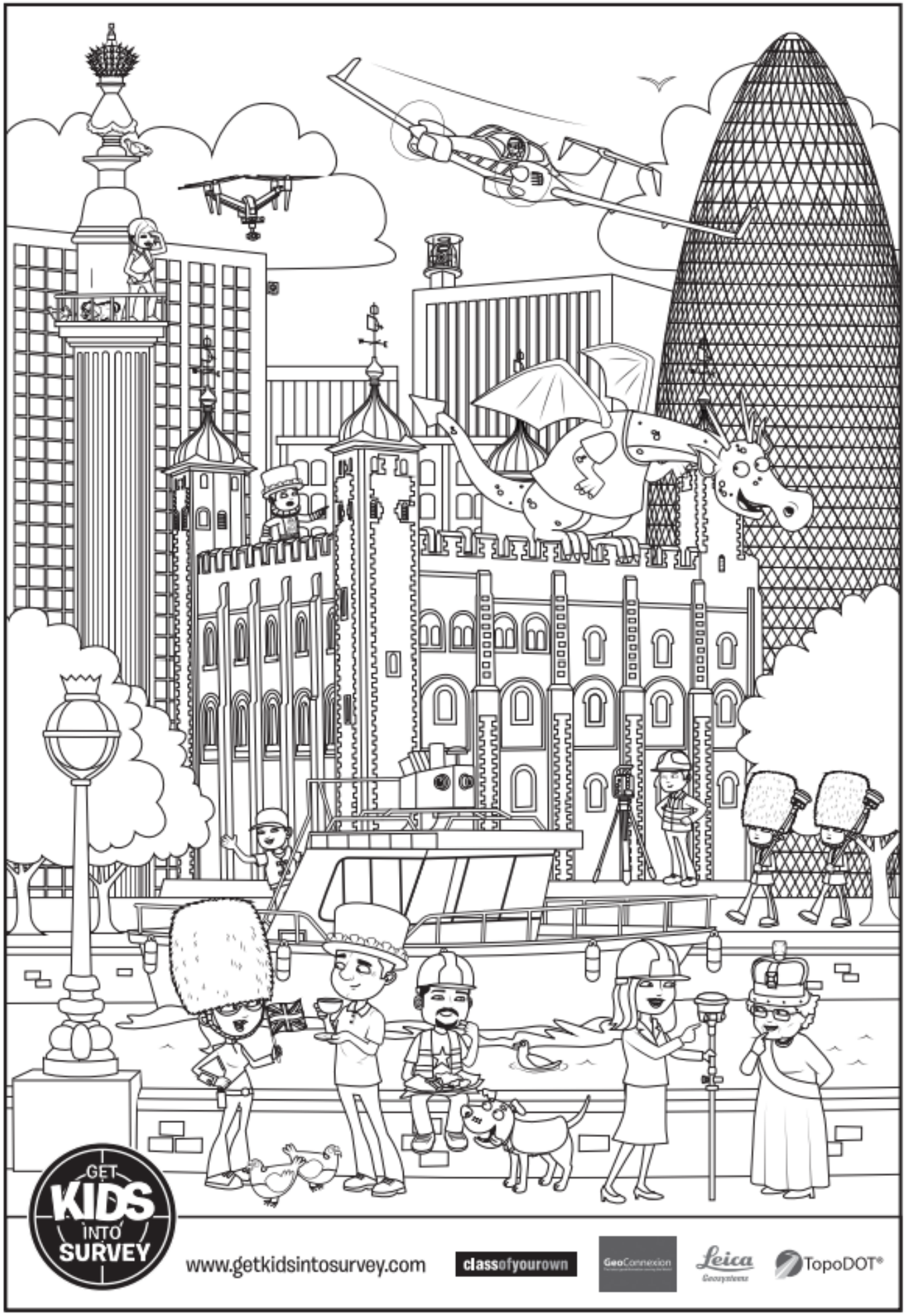
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Thoughts on Professional Practice and Education

Article 12: Life-Time Continuing Education Waiver with Academic Education

by Knud E. Hermansen †
P.L.S., P.E., Ph.D., Esq.

This is the twelfth article I have prepared in the series offering thoughts on professional practice and education. In this article I am going to reflect on formal education and continuing education requirements.

At the outset, I must point out the elephant in the room. I acknowledge that I hold a Ph.D. and a juris doctorate. I mention this since some will accuse me of self-serving when reading this article. I'm not going to surrender my degrees in order to appear unbiased. I was never known to shy from controversy in living my life or my writing. My contact information is on the web. Feel free to write and chastise me. Don't expect much self-reflection at my age. The sand in my life's hour glass is almost run out. At my age, changing course or my opinion is not likely to happen.

Let me get to the point of this article. Many states have adopted continuing education requirements for re-licensing. This article focuses on the disconnect between state continuing education regulations and academic education achievements.

In this article, I wish to focus on the fact that all states with continuing education requirements have decoupled the requirements for continuing education from academic education other than allow continuing education credit for an academic course taken in a renewal cycle. Specifically, states that require continuing education make no allowances for the achievement of formal academic education. By way of example, a state will require a certain number of professional development hours a year for all licensees regardless whether the licensee has no degree or a doctorate in the profession. This makes no practical sense, at least to me. Let me explain.

As a general rule, a one-credit academic course is worth fourteen professional development hours. A typical bachelor of science degree in the profession has at least 30 credit hours in focused professional course work. A master's degree in the profession has an additional 30 credit hours focused on professional course topics. Finally, a doctorate has another 60 credit hours above the master's degree focused on professional course topics. Therefore, a licensee with a master's degree has earned the equivalent of 420 professional development hours. A licensee with a master's and doctorate degree has earned the equivalent of 1,260 professional development hours. For a state that requires fifteen professional development hours a year, the licensee with a doctorate has achieved the equivalent of 84 years of continuing education. Unless the licensee stretches their formal academic education coursework over their lifetime, the licensee will only get to claim their formal academic education courses for perhaps two to three license renewals. Perhaps another renewal period can be claimed if the state allows some carryover of continuing education hours.

Unless a licensee with a master's degree or doctorate develops amnesia or dementia, the licensee with formal academic degrees will retain a significant portion of the knowledge from their formal education throughout their professional career. Continuing education regulations should recognize this achievement and give life-time credit for academic education achievements.

I offer four reasons to permit academic education achievements to allow for life-time credit for continuing education.

First, if continuing education is meant to foster professional development, individuals with academic degrees, especially advanced academic degrees, have achieved professional development and knowledge well beyond the typical licensee.

Second, the licensee that has pursued and obtained academic degrees, especially advanced degrees, has shown a commitment for lifelong learning. The licensee will not likely put that commitment aside after completing the degree. The licensee will not need to be coerced to continue life-long learning.

Third, giving life-time credit for degree achievements will encourage licensees to have a focused approach toward meeting continuing education requirements. Completed academic courses that can be used toward a degree and also substitute for continuing education throughout a licensee's lifetime means that time and money spent on course work will save the licensee time and money later.

Finally, recognition of academic degrees for continuing education will encourage licensees to obtain degrees. States that have no degree requirements for licensure will encourage surveyors to obtain a degree by awarding life-time continuing education credit for a degree. All states can encourage licensees to obtain an advanced degree by permitting life-time credit for advanced academic education culminating in a degree.

I will add that many states already couple academic degrees with experience requirements. Those individuals seeking licensure with formal academic degrees often have to show less experience in order to obtain licensure.

Having given reasons for life-time continuing education credit for academic degrees, I now offer advice by suggesting regulations to be adopted using the same or similar wording as follows:

> Licensees with at least thirty credit hours of surveying or related course work and a bachelor of science degree may waive half the continuing education requirements for renewal of licensure for every renewal period. (Note any bachelor of science degree with ABET accreditation in surveying, geomatics, or similar title will be presumed to meet the requirement of thirty credit hours.)
>
> Licensees with a master of science degree along with forty-five credit hours in surveying or related course work may waive three-fourth of the continuing education requirements for renewal of licensure for each renewal period. (Undergraduate and graduate surveying or related course work is counted toward the forty-five credits.)

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GIS Technology Plays Crucial Role in Wildfire Management and Response

Feb 7, 2025
Jesse Khalil & Matteo Luccio
gpsworld.com

The Palisades and Eaton fires devastated parts of Los Angeles in January 2025 and are largely contained as of Jan. 20. Fueled by extreme Santa Ana winds and dry conditions, these fires have left a mark on the region's landscape and community.

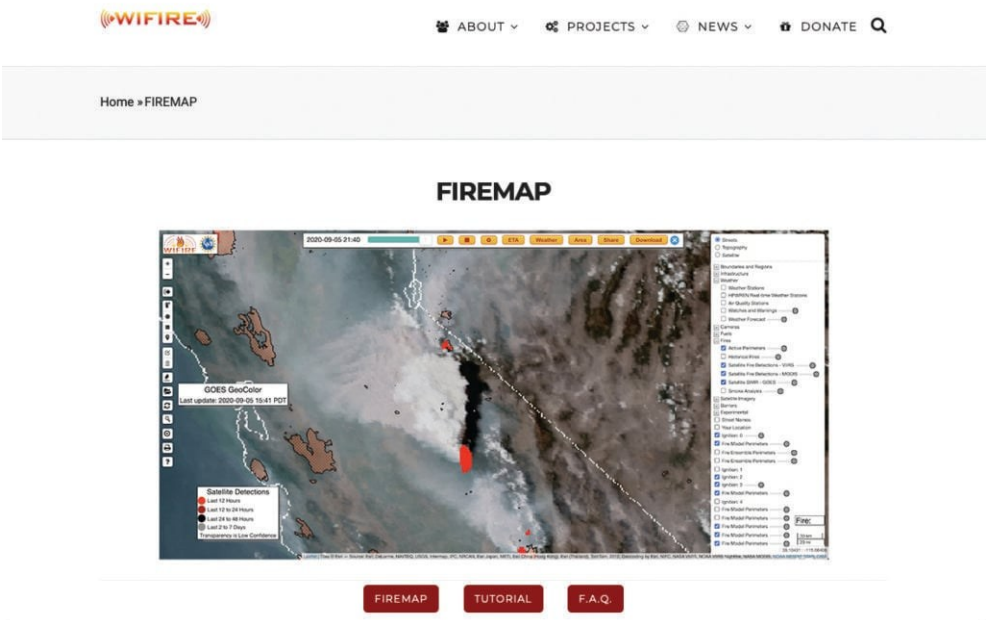
The Palisades Fire, which originated in the Pacific Palisades on Jan. 7, ultimately burned 23,448 acres, resulted in 12 confirmed fatalities and destroyed or damaged more than 6,800 structures, according to the California Department of Forestry and Fire Protection, known as CAL FIRE. The fire's rapid expansion was particularly alarming, growing from a small brush fire to a massive conflagration within an hour.

Simultaneously, the Eaton Fire, which began near Altadena and Pasadena, consumed 14,117 acres. This fire proved even more deadly, with 17 confirmed fatalities and significant damage to more than 10,000 structures, according to CAL FIRE. Both the Palisades and Eaton fires have now been classified among the most destructive wildfires in California's history.

During times of emergency, geographic information systems (GIS) specialists come together to create real-time mapping tools to provide critical support to first responders and keep communities well-informed. These tools have become indispensable in modern disaster management, particularly in wildfire response.

Interactive 3D Maps

Firefighters and other specialists from federal, state, and local agencies work together to fight wildfires. GIS specialists develop interactive 3D maps to display fire perimeters, evacuation



Interagency GIS teams use the Fire Integrated Real-Time Intelligence System (FIRIS) to watch for fire starts and then receive alerts from dispatch centers and satellite imagery. After locating the point of ignition, they create fire behavior models using a program called WIFIRE from UC San Diego. This tool allows them to predict the fire's probable trajectory and size.

zones and other critical data. The geospatial data serves as the foundation for effective communication and decision-making, allowing firefighters and incident management teams to access information in near real-time to make informed decisions.

Fire GIS specialists Peter Rowland, Brett Adler and Dawn Hutchinson shared insights into their teams' strategies for wildfire management. They emphasize the crucial role of geospatial tools in disaster response by delivering actionable intelligence. *GPS World* interviewed them during the California wildfires. Rowland and Adler were based at the Palisades fire, while Hutchinson, who is a member of a California Interagency Incident Management Team (CIIMT), was located near the Eaton fire.

The team will alert the state if the data shows the fire is likely to spread. Hutchinson explains that, within minutes of the start of the Eaton fire, her team produced a fire behavior model that illustrated where the fire was most likely to go and how big it would likely get within the next three hours.

The frequency of IR flights depends on the fire's size and intensity. Occurring anywhere from once to three times daily, including nighttime, these flights comprehensively map the landscape based on the fire's specific traits. The decision on how often to fly the planes and collect the IR data depends on the fire's behavior and potential threat level.

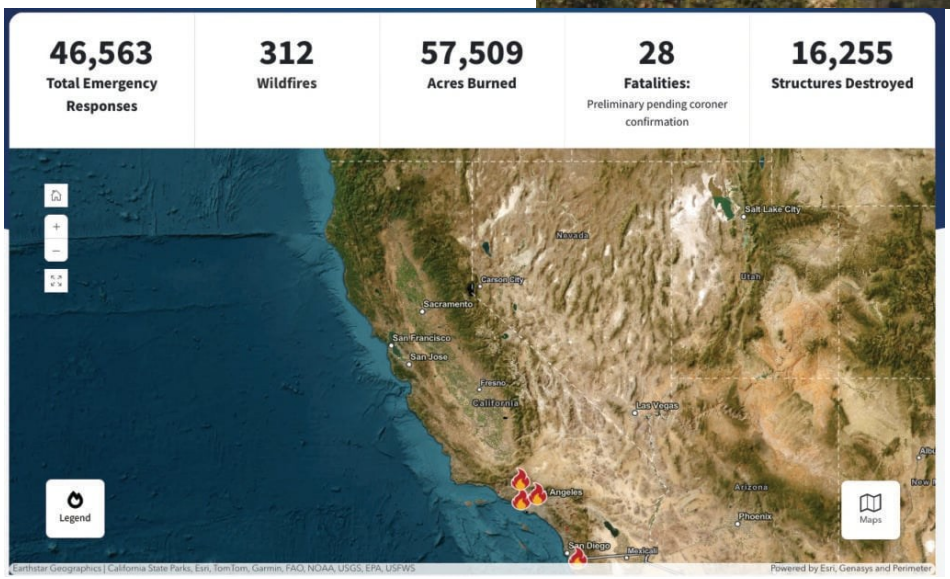
Field observers are also deployed daily to collect data down to the debris. They walk the fire's edge and move along specific paths created for wildfire management and containment. Once a fire is contained, GIS specialists try to verify ground truth for the perimeter of the entire fire.

GIS specialists constantly update fire perimeters as they get data from the field and the planes. Once a fire is contained, they create final maps to hand over to the local agencies or the Forest Service.

Most of the data that GIS specialists use to map fires comes from field observers and infrared (IR) thermal imagery. The data is collected by third-party contractors, by CAL FIRE's Intel shift team, or by the FIRIS program by flying manned aircraft.

IR data and information collected by field observers are then uploaded into the National Incident Feature Service (NIFS) for GIS specialists to use to map fires.

Field observers download the maps onto their devices, go out into the field, and ground truth — physically walking the perimeter of the fire and using GPS on their devices to map the fire boundaries accurately.



Paper maps are good to have "just to get everybody on the same page without having to worry about battery life or the glare while you're working out in the field," said Rowland.

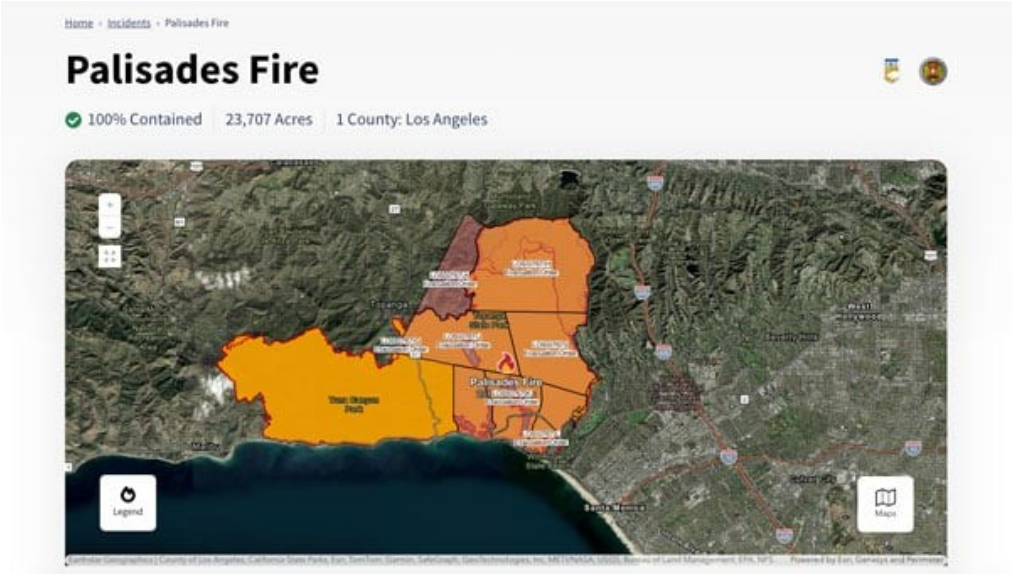
Along with online maps, the Interagency GIS teams print PDF maps for fire personnel in the field. The field observers use Esri ArcGIS Field Maps to record their tracks. They pair their mobile devices with Avenza or other geolocating applications.

Using ArcGIS Pro, GIS specialists

(Continued from page 23)

create online maps and dashboards, which are then distributed in print and/or digitally to the agencies that need them, such as sheriff and police departments and departments of public works. The Interagency GIS teams create different map products for different end users. For example, it works with law enforcement to create evacuation maps and zones. Local public information officers also can distribute these maps or post them on their websites.

Crews also have online access to the maps through wildfire FTP (ftp.wildfire.gov). Crews load data and maps there that contain public information. Many agencies plug into the National Interagency Fire Center (NIFC), where the CAL FIRE team edits and analyzes mobile data.



(Continued from page 21)

Licensees with a doctorate degree along with sixty credit hours in surveying or related course work may waive all continuing education requirements for renewal of licensure for each renewal period. (All undergraduate and graduate surveying or related course work is counted toward the sixty credits.)

I will close by suggesting that the appearance of a conflict of interest in advocating this recognition, is really not a conflict of interest if the reader delves into my life. Having lived to the age I find myself at, I recognize that I will be long dead before regulations are changed and there would be an easing in continuing education requirements that could affect me because of the degrees I have.

† Other books and articles by Knud can be found at https://umaine.edu/svt/faculty/hermansen-articles/

PSAN Board Meeting Schedule

March 12, 2025
June 11, 2025
September 11, 2025
December 3, 2025

All meetings are held at the
Nebraska State Surveyor's Office
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2026 Winter Conference

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